## UNIQUE STUDY POINT

## PRACTISE PAPER MCQ CLASS X BY SUMEET SAHU

### Class 10 - Mathematics

1. If a = ($2^2 \times 3^3 \times 5^4$) and b = ($2^3 \times 3^2 \times 5$) then HCF (a, b) = ? **[1]**

   a) 540 b) 360
   c) 180 d) 90

2. 2 - $\sqrt{3}$ is **[1]**

   a) an integer b) a whole number
   c) an irrational number d) a rational number

3. If the prime factorisation of 2520 is $2^3 \times 3^a \times b \times 7$, then the value of a + 2b is: **[1]**

   a) 9 b) 10
   c) 7 d) 12

4. If 3825 = $3^x \times 5^y \times 17^z$, then the value of x + y - 2z is: **[1]**

   a) 1 b) 3
   c) 0 d) 2

5. The prime factorisation of 1728 is **[1]**

   a) $2^5 \times 3^4$ b) $2^6 \times 3^2$
   c) $2^5 \times 3^3$ d) $2^6 \times 3^3$

6. If $p_1$ and $p_2$ are two odd prime numbers such that $p_1 > p_2$, then $p_1^2 - p_2^2$ is **[1]**

   a) an odd prime number b) a prime number
   c) an odd number d) an even number

7. Prime factorisation of 424 is: **[1]**

   a) $2^3 \times 53$ b) $2^4 \times 53$
   c) $2 \times 53 \times 2$ d) $2 \times 53 \times 4$

8. If HCF (26,169) = 13, then LCM (26,169) = **[1]**

   a) 338 b) 52
   c) 13 d) 26

9. If the HCF of 72 and 234 is 18, then the LCM (72, 234) is: **[1]**

   a) 936 b) 836
   c) 324 d) 234

10. Four different electronic devices make a beep after every 30 minutes, 1 hour, $1\frac{1}{2}$ hour and 1 hour 45 minutes **[1]**

respectively. All the devices beeped together at 12 noon. They will again beep together at ________.

a) 3 a.m.

b) 12 midnight

c) 9 a.m.

d) 6 a.m.

11. The LCM of two numbers is 1200. Which of the following cannot be their HCF? **[1]**

a) 500

b) 200

c) 400

d) 600

12. $7 \times 11 \times 13 + 13$ is a/an: **[1]**

a) odd number but not composite

b) composite number

c) prime number

d) square number

13. The LCM of smallest 2-digit number and smallest composite number is **[1]**

a) 20

b) 4

c) 12

d) 40

14. Which of the followings is an irrational number? **[1]**

a) $(\sqrt{2}-1)^2$

b) $\left(2\sqrt{3}-\frac{1}{\sqrt{3}}\right)^2$

c) $\sqrt{2}-(2+\sqrt{2})$

d) $\frac{(\sqrt{2}+5\sqrt{2})}{\sqrt{2}}$

15. The prime factorisation of the number 5488 is **[1]**

a) $2^4 \times 7^4$

b) $2^4 \times 7^3$

c) $2^3 \times 7^4$

d) $2^3 \times 7^3$

16. A quadratic polynomial having zeroes -6 and 0 is: **[1]**

a) $6(x^2 - x)$

b) $x(x^2 + 6)$

c) $6x^2 - 1$

d) $6x (x + 6)$

17. If -2 and 3 are the zeros of the quadratic polynomial $x^2 + (a + 1)x + b$ then **[1]**

a) a = -2, b = 6

b) a = -2, b = -6

c) a = 2, b = -6

d) a = 2, b = 6

18. The sum of zeroes of the polynomial $\sqrt{2}\, x^2 - 17$ are given as: **[1]**

a) 0

b) $\frac{17\sqrt{2}}{2}$

c) 1

d) $-\frac{17\sqrt{2}}{2}$

19. If one root of the polynomial $f(x) = 3x^2 + 11x + p$ is reciprocal of the other, then the value of p is **[1]**

a) -3

b) 0

c) 3

d) $\frac{1}{3}$

20. If α and β are the zeros of the polynomial $f(x) = x^2 + px + q$, then a polynomial having $\frac{1}{\alpha}$ and $\frac{1}{\beta}$ is its zero is **[1]**

a) $qx^2 + px + 1$

b) $x^2 - px + q$

c)

d)

$x^2 + qx + p$ | $px^2 + qx + 1$

21. If α, β are the zeros of polynomial $f(x) = x^2 - p(x + 1) - c$, then $(\alpha + 1)(\beta + 1) =$ **[1]**

a) $c - 1$ | b) $c$
c) $1 - c$ | d) $1 + c$

22. The number of polynomials having zeros 1 and -2 is **[1]**

a) more than 3 | b) 2
c) 3 | d) 1

23. The zeroes of the polynomial $3x^2 + 11x - 4$ are: **[1]**

a) $\frac{-1}{3}$, -4 | b) $\frac{1}{3}$, -4
c) $\frac{-1}{3}$, 4 | d) $\frac{1}{3}$, 4

24. A quadratic polynomial with sum and product of its zeros as 8 and -9 respectively is **[1]**

a) $x^2 + 8x - 9$ | b) $x^2 - 8x - 9$
c) $x^2 - 8x + 9$ | d) $x^2 + 8x + 9$

25. A quadratic polynomial whose product and sum of zeroes are $\frac{1}{3}$ and $\sqrt{2}$ respectively is **[1]**

a) $3x^2 - x + 3\sqrt{2}x$ | b) $3x^2 + x - 3\sqrt{2}x$
c) $3x^2 + 3\sqrt{2}x + 1$ | d) $3x^2 - 3\sqrt{2}x + 1$

26. If one root of the polynomial $p(y) = 5y^2 + 13y + m$ is reciprocal of other, then the value of m is **[1]**

a) 5 | b) 6
c) $\frac{1}{5}$ | d) 0

27. If $\alpha$ and $\beta$ are the zeroes of the polynomial $ax^2 + bx + c$, then the value of $\frac{\alpha}{\beta} + \frac{\beta}{\alpha}$ is **[1]**

a) $\frac{b^2}{ac}$ | b) $\frac{c^2}{ab}$
c) $\frac{b^2-2ac}{ac}$ | d) $\frac{a^2}{bc}$

28. If $\alpha$ and $\beta$ are the zeroes of the quadratic polynomial $p(x) = x^2 - ax - b$, then the value of $\alpha^2 + \beta^2$ is: **[1]**

a) $b^2 + 2a$ | b) $a^2 - 2b$
c) $b^2 - 2a$ | d) $a^2 + 2b$

29. The sum and product of the zeroes of the polynomial $x^2 - 6x + 8$ are respectively **[1]**

a) 6 and 8 | b) $\frac{-3}{2}$ and – 1
c) $\frac{-3}{2}$ and 1 | d) $\frac{3}{2}$ and 1

30. The polynomial having zeroes -3 and 4 is: **[1]**

a) $x^2 - x - 12$ | b) $x^2 - 2x + 1$
c) $x^2 + 2x - 1$ | d) $x^2 + 2x + 1$

31. If one zero of the quadratic polynomial $x^2 + 3x + k$ is 2, then the value of ‘k’ is **[1]**

a) – 10 b) 10

c) 5 d) – 5

32. A quadratic polynomial whose zeros are $\frac{3}{5}$ and $\frac{-1}{2}$, is **[1]**

a) $10x^2 - x - 3$ b) $10x^2 - x + 3$

c) $10x^2 + x + 3$ d) $10x^2 + x - 3$

33. If one zero of the polynomial $f(x) = (k^2 + 4)x^2 + 13x + 4k$ is reciprocal of the other, then k = **[1]**

a) 1 b) −2

c) 2 d) −1

34. The zeroes of the polynomial $p(x) = x^2 + 3x + 2$ are given as. **[1]**

a) -2, 1 b) 2, -1

c) 1, 2 d) -2, -1

35. The sum and product of zeroes of the polynomial $p(x) = 3x^2 - 5x + 2$ are **[1]**

a) 1, $\frac{2}{3}$ b) $\frac{-5}{3}$, $\frac{-2}{3}$

c) $\frac{-5}{3}$, $\frac{2}{3}$ d) $\frac{5}{3}$, $\frac{2}{3}$

36. At the end of the year 2002, Sam was half as old as his grandfather. The sum of the years in which they were born is 3854. Age of Sam at the end of year 2003 is ________. **[1]**

a) 36 years b) 51 years

c) 50 years d) 35 years

37. Graphically, the pair of linear equations 3x - y + 8 = 0 and 3x - y = 24 represents two lines which are: **[1]**

a) intersecting exactly at two points b) coincident

c) parallel d) intersecting exactly at one point

38. If $\frac{2x}{3} - \frac{y}{2} + \frac{1}{6} = 0$ and $\frac{x}{2} + \frac{2y}{3} = 3$ then **[1]**

a) x = -2, y = 3 b) x = - 2, y = -3

c) x = 2, y = 3 d) x = 2, y = -3

39. The value of k, if (6, k) lies on the line represented by x - 3y + 6 = 0, is **[1]**

a) 4 b) -12

c) 12 d) -4

40. The value of k for which the pair of equations kx = y + 2 and 6x = 2y + 3 has infinitely many solutions, **[1]**

a) is k = -3 b) does not exist

c) is k = 3 d) is k = 4

41. The sum of the numerator and denominator of a fraction is 12. If the denominator is increased by 3, the fraction becomes $\frac{1}{2}$, then the fraction is **[1]**

a) $\frac{8}{7}$ b) $\frac{5}{7}$

c) $\frac{6}{7}$ d) $\frac{4}{7}$

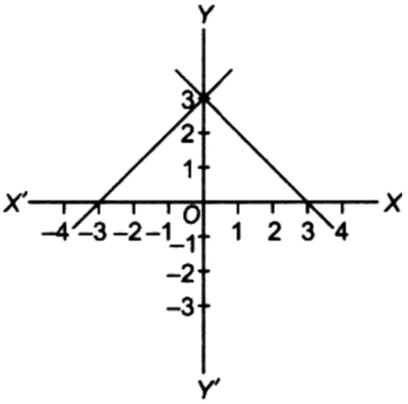
42. The solution of the pair of equations x + y = a + b and ax - by = $a^2 - b^2$ is: **[1]**

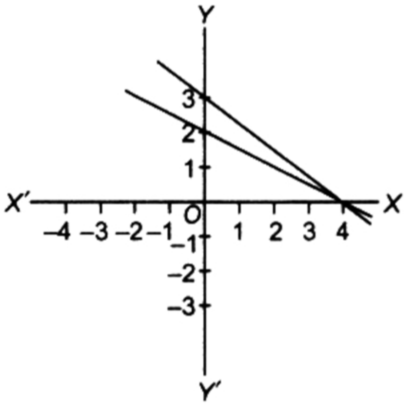
a) x = -a, y = b
b) x = b, y = a
c) x = a, y = b
d) x = a, y = -b

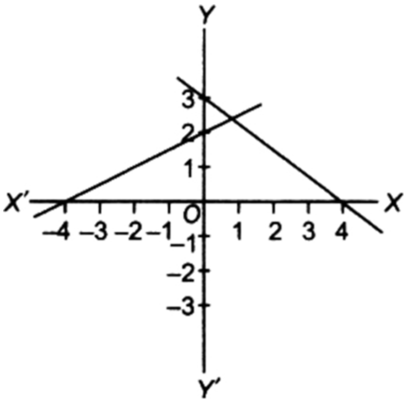
43. The area of the triangle formed by the lines 2x + 3y = 12 with the co – ordinate axis is **[1]**

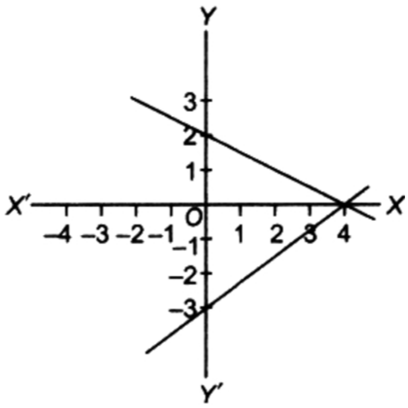
a) 12 sq. units
b) 20 sq. units
c) 10 sq. unit
d) 16 sq. units

44. Which of the following graphs represent the lines 2x + 4y = 8 and 3x - 4y = 12? **[1]**

a)



b)



c)



d)



45. In a given fraction, if 1 is subtracted from the numerator and 2 is added to the denominator, it becomes $\frac{1}{2}$. If 7 is subtracted from the numerator and 2 is subtracted from the denominator, it becomes $\frac{1}{3}$. The fraction is **[1]**

a) $\frac{15}{26}$
b) $\frac{13}{24}$
c) $\frac{16}{21}$
d) $\frac{16}{27}$

46. If (-3, 2) is a solution of the linear equation 5x + 3 ky = 3, then the value of k is ________. **[1]**

a) 6
b) 3
c) 5
d) 2

47. The area of the triangle formed by the lines x = 3, y = 4 and x = y is **[1]**

a) 3sq. unit
b) 1/2 sq. unit
c) 2sq. unit
d) 1 sq. unit

48. If a pair of linear equation is consistent, then the lines will be **[1]**

a) parallel
b) intersecting or coincident
c) always coincident
d) always intersecting

49. Graphically, the pair of equations -6x - 2y = 21 and 2x - 3y + 7 = 0 represents two lines which are: **[1]**

a) intersecting exactly at two points
b) intersecting exactly at one point
c) coincident
d) parallel

50. The pair of linear equations x + 2y + 5 = 0 and -3x - 6y + 1 = 0 has: **[1]**

a) a unique solution
b) exactly two solutions
c) infinitely many solutions
d) no solution

51. If the lines represented by equations 3x + 2my = 2 and 2x + 5y + 1 = 0 are parallel, then the value of m is: **[1]**

a) $\frac{3}{2}$
b) $\frac{15}{4}$
c) $-\frac{5}{4}$
d) $\frac{2}{5}$

52. If a pair of linear equations in two variables is consistent, then the lines represented by two equations are **[1]**

a) always coincident
b) intersecting or coincident
c) always intersecting
d) parallel

53. If the pair of equations 3x - y + 8 = 0 and 6x - ry + 16 = 0 represent coincident lines, then the value of **r** is: **[1]**

a) $-\frac{1}{2}$
b) $\frac{1}{2}$
c) -2
d) 2

54. The value of k for which the pair of linear equations 5x + 2y - 7 = 0 and 2x + ky + 1 = 0 don't have a solution, is: **[1]**

a) 5
b) $\frac{5}{4}$
c) $\frac{4}{5}$
d) $\frac{5}{2}$

55. If the system 6x – 2y = 3, kx – y = 2 has a unique solution, then **[1]**

a) k = 3
b) $k \neq 3$
c) $k \neq 4$
d) k = 4

56. Which of the given is a quadratic equation? **[1]**

a) $x + \frac{1}{x} = x^2$
b) $2x^2 - 5x = (x-1)^2$
c) $x^2 - 3\sqrt{x} + 2 = 0$
d) $x + \frac{1}{x^2} = 5$

57. If p and q are the roots of the equation $x^2$ + px + q = 0, then **[1]**

a) p = - 2, q = 0
b) b = 0, 9 = 1
c) p = 1, q = - 2
d) p = - 2, q = l

58. The roots of the quadratic equation $x^2$ - 4 = 0 is/are: **[1]**

a) 2 only
b) -2, 2
c) -4, 4
d) 4 only

59. If $\alpha$ and $\beta$ are the roots of $ax^2$ + bx + c = 0, then the wrong statement is **[1]**

a) $\alpha\beta = \frac{c}{a}$
b) $\alpha + \beta = \frac{b}{a}$
c) $\alpha^2 + \beta^2 = \frac{b^2 - 2ac}{a^2}$
d) $\frac{1}{\alpha} + \frac{1}{\beta} = \frac{-b}{c}$

60. If $x^2$ + 5kx + 16 = 0, has equal roots, then the value of k is **[1]**

a) $\pm\frac{25}{64}$
b) $\pm\frac{64}{25}$

c) $\pm\frac{8}{5}$ | d) $\pm\frac{5}{8}$

61. If the roots of $5x^2$ -kx + 1 = 0 are real and distinct then **[1]**

a) $-2\sqrt{5} < k < 2\sqrt{5}$
b) $k < -2\sqrt{5}$ only
c) either $k > 2\sqrt{5}$ or $k < -2\sqrt{5}$
d) $k > 2\sqrt{5}$ only

62. If the equation $x^2 + 2(k + 2)x + 9k = 0$ has equal roots then k = ? **[1]**

a) -1 or 4
b) 1 or - 4
c) 1 or 4
d) -1 or - 4

63. The perimeter of a right triangle is 70cm and its hypotenuse is 29cm. The area of the triangle is **[1]**

a) 200 sq.cm
b) 180 sq.cm
c) 210 sq.cm
d) 250 sq.cm

64. If one root of the equation $x^2 + ax + 3 = 0$ is 1, then its other root is **[1]**

a) 2
b) 3
c) -3
d) -2

65. Which of the following is not a quadratic equation? **[1]**

a) $2(x-1)^2 = 4x^2 - 2x + 1$
b) $x = x^2 + 3 + 4x^2$
c) $\left(\sqrt{2}x + \sqrt{3}\right)^2 + x^2 = 3x^2 - 5x$
d) $2x - x^2 = x^2 + 5$

66. The perimeter of a rectangle is 82 m and its area is 400 $m^2$. The breadth of the rectangle is **[1]**

a) 20 m
b) 9 m
c) 16 m
d) 25 m

67. The value(s) of k for which the quadratic equation $3x^2$ - kx + 3 = 0 has equal roots, is (are) **[1]**

a) -6
b) $\pm 6$
c) 6
d) 9

68. The values of k for which the quadratic equation $2x^2 – kx + k = 0$ has equal roots is **[1]**

a) 0, 8
b) 8 only
c) 0 only
d) 4

69. Which of the following equations has 2 as a root? **[1]**

a) $x^2 + 3x – 12 = 0$
b) $x^2 – 4x + 5 = 0$
c) $2x^2 – 7x + 6 = 0$
d) $3x^2 – 6x – 2 = 0$

70. $3x^2 + 2x - 1 = 0$ have **[1]**

a) No Real roots
b) Real roots
c) real and equal root
d) Real and Distinct roots

71. If p = -7 and q = 12 and $x^2 + px + q = 0$, Then the value of x is **[1]**

a) -3 and 4
b) -3 and -4

c) 3 and 4 | d) 3 and -4

72. $(x^2 + 1)^2 – x^2 = 0$ has **[1]**

a) two real roots | b) no real roots

c) one real root. | d) four real roots

73. The ratio of the sum and product of the roots of the quadratic equation $5x^2 - 6x + 21 = 0$ is: **[1]**

a) 5 : 21 | b) 21 : 5

c) 7 : 2 | d) 2 : 7

74. If $\frac{1}{2}$ is a root of the equation $x^2 + kx - \frac{5}{4} = 0$, then the value of k is **[1]**

a) $\frac{1}{4}$ | b) 2

c) -2 | d) $\frac{1}{2}$

75. The roots of the quadratic equation $ax^2 + bx + c = 0$ are real and distinct, if: **[1]**

a) $b^2 - 4ac = 0$ | b) $b^2 - 4ac > 0$

c) $b^2 - 4ac \geq 0$ | d) $b^2 - 4ac < 0$

**Solution**

**PRACTISE PAPER MCQ CLASS X BY SUMEET SAHU**

**Class 10 - Mathematics**

1.

**(c)** 180

**Explanation:**

It is given that: a = ($2^2 \times 3^3 \times 5^4$) and b = ($2^3 \times 3^2 \times 5$)

$\therefore$ HCF (a, b) = Product of smallest power of each common prime factor in the numbers = $2^2 \times 3^2 \times 5$ = 180

2.

**(c)** an irrational number

**Explanation:**

Let 2 - $\sqrt{3}$ be rational number

2 - $\sqrt{3}$ = $\frac{p}{q}$ where p and q are composite numbers

$\sqrt{3}$ = $\frac{p}{q}$ + 2

$\sqrt{3}$ = $\frac{(p+2q)}{q}$

since p, q are integers, so $\frac{(p+2q)}{q}$ is rational

$\therefore\sqrt{3}$ is an irrational number

it shows our supposition was wrong

hence 2-$\sqrt{3}$ is an irrational number.

3.

**(d)** 12

**Explanation:**

$2520 = 2^3 \times 3^2 \times 5 \times 7$

on comparing

a = 2, b = 5

So,

a + 2b = 2 + 2 $\times$ 5

= 12

4.

**(d)** 2

**Explanation:**

$3825 = 3^2 \times 5^2 \times 17$

On comparing

x = 2, y = 2, z = 1

x + y - 2z = 2 + 2 - 2 $\times$ 1

= 4 - 2

= 2

5.

**(d)** $2^6 \times 3^3$

**Explanation:**

$2^6 \times 3^3$

6.

**(d)** an even number

**Explanation:**

Let $p_1$ and $p_2$ be 5 two odd primes.

Then,

$p_1^2 - p_2^2 = (p_1 - p_2)(p_1 + p_2)$

We know that sum and difference of two odd numbers is even

$\therefore (p_1 - p_2)\ and\ (p_1 + p_2)$ are even numbers.

Also, we know that product of even numbers is an even number, therefore

$p_1^2 - p_2^2 = (p_1 - p_2)(p_1 + p_2)$, is an even number.

7. **(a)** $2^3 \times 53$

**Explanation:**

| | |
|---|---|
| 2 | 424 |
| 2 | 212 |
| 2 | 106 |
| 53 | 53 |
| | 1 |

424 = $2^3 \times 53$

8. **(a)** 338

**Explanation:**

HCF (26, 169) = 13

We have to find the value for LCM (26, 169)

We know that the product of numbers is equal to the product of their HCF and LCM.

Therefore,

13(LCM) = 26(169)

$\text{LCM} = \frac{26(169)}{13}$

LCM = 338

9. **(a)** 936

**Explanation:**

LCM (72, 234) = $\frac{(72 \times 234)}{18}$ = 936

Therefore, the LCM of (72, 234) is 936.

10.

**(c)** 9 a.m.

**Explanation:**

L.C.M. (30, 60, 90, 105) = $2^2 \times 3^2 \times 5 \times 7$

= 1260 mins = 21 hours

11. **(a)** 500

**Explanation:**

It is given that the LCM of two numbers is 1200 .

We know that the HCF of two numbers is always the factor of LCM.

500 is not the factor of 1200.

So this cannot be the HCF.

12.

**(b)** composite number

**Explanation:**

We have $7 \times 11 \times 13 + 13 = 13 (77 + 1) = 13 \times 78$. Since the given number has 2 more factors other than 1 and itself, therefore it is a composite number.

13. **(a)** 20

**Explanation:**

As we know, the smallest two-digit number is 10 and the smallest composite number is 4.
By prime factorisation, we get;
4 = 2 × 2
10 = 2 × 5
Now, LCM of 4, 10 = 2 × 2 × 5 = 20
Therefore, the LCM of the smalles two-digit number and the smallest composite number is 20.

14. **(a)** $(\sqrt{2}-1)^2$
**Explanation:**
$(\sqrt{2}-1)^2$

15.
**(b)** $2^4 \times 7^3$
**Explanation:**
$2^4 \times 7^3$

16.
**(d)** 6x (x + 6)
**Explanation:**
6x (x + 6)

17.
**(b)** a = -2, b = -6
**Explanation:**
$\alpha+\beta=3+(-2)=1$ and $\alpha\beta=3\times(-2)=-6$
∴ -(a + 1) = 1
⇒ a + 1 = -1 ⇒ a = -2
Also, b = -6

18. **(a)** 0
**Explanation:**
Given; P(x) = $\sqrt{2}\,x^2$ - 17
Sum of zeroes = $\frac{\text{coeff of x}}{\text{coeff of } x^2}$
= 0

19.
**(c)** 3
**Explanation:**
Let one root be q.
∴ Other root = $\frac{1}{q}$
⇒ q × $\frac{1}{q}$ = $\frac{p}{3}$ ⇒ 1 = $\frac{p}{3}$ ⇒ p = 3

20. **(a)** $qx^2 + px + 1$
**Explanation:**
Let $\alpha$ and $\beta$ be the zeros of the polynomial $f(x)=x^2+px+q$ .Then,
$\alpha+\beta=\frac{-\text{ Coefficient of } x}{\text{Coefficient of } x^2}=-\frac{p}{1}=-p$
And $\alpha\beta=\frac{\text{Constant term}}{\text{Coefficient of } x^2}=\frac{q}{1}$ = q
Let S and R denote respectively the sum and product of the zeros of a polynomial whose zeros are $\frac{1}{\alpha}$ and $\frac{1}{\beta}$, then
$S=\frac{1}{\alpha}+\frac{1}{\beta}=\frac{\alpha+\beta}{\alpha\beta}=\frac{-p}{q}$
$R=\frac{1}{\alpha}\times\frac{1}{\beta}=\frac{1}{\alpha\beta}=\frac{1}{q}$
Hence, the required polynomial $g(x)$ whose sum and product of zeros are S and R is given by

$x^2 - Sx + R = 0$
$x^2 + \frac{P}{q}x + \frac{1}{q} = 0$
$\frac{qx^2 + Px + 1}{q} = 0$
$\Rightarrow \quad qx^2 + px + 1$
So $g(x) = qx^2 + px + 1$

21.

**(c)** 1 − c
**Explanation:**
Since $\alpha$ and $\beta$ are the zeros of quadratic polynomial $f(x) = x^2 - p(x+1) - c$
$= x^2 - px - p - c$
$\alpha + \beta = \frac{-\text{ Coefficient of } x}{\text{Coefficient of } x^2}$
$= -\left(\frac{-p}{1}\right)$ = p
$\alpha \times \beta = \frac{\text{Constant term}}{\text{Coefficient of } x^2}$
$= \frac{-p-c}{1}$ = $-p - c$
We have
$(\alpha + 1)(\beta + 1)$
$= \alpha\beta + \beta + \alpha + 1$
$= \alpha\beta + (\alpha + \beta) + 1$
$= -p - c + (p) + 1$
$= -c + 1$
= 1 - c
The value of $(\alpha + 1)(\beta + 1)$ is 1 - c.

22. **(a)** more than 3
**Explanation:**
Since, 1 and -2
Sum of Roots = 1+(-2) = -1
Product of roots = (1) (-2) = -2
Therefore, the polynomial (p(x)) is: [p(x) =K[$x^2$ - (sum of roots)x + product of roots]
p(x) = K [ $x^2$ - (-1)x+ (-2)]
Therefore, There are infinitely many polynomials that can have (1) and (-2) as their zeros. We can multiply or divide the polynomial by any nonzero constant(k), and the zeros will remain the same. So, the required number of polynomials is **infinite**!

23.

**(b)** $\frac{1}{3}$, -4
**Explanation:**
Let f(x) = $3x^2$ + 11x - 4
f(x) = $3x^2$ + 12x - x - 4
f(x) = 3x(x + 4) - 1 (x + 4)
f(x) = (x + 4)(3x - 1)
Put both the factors equal to zero.
x + 4 = 0, x = -4
3x - 1 = 0, x = $\frac{1}{3}$
The zeroes of the polynomial $3x^2$ + 11x - 4 are $\frac{1}{3}$ and - 4.

24.

**(b)** $x^2$ - 8x - 9
**Explanation:**
Given,
$\alpha + \beta$ = 8

$\alpha\beta$ = -9

p(x) = k(x$^2$ - $(\alpha + \beta)$x + $\alpha\beta$)

= k(x$^2$ - (8)x + (-9))

= k(x$^2$ - 8x - 9)

for k = 1,

p(x) = x$^2$ - 8x - 9

25.

**(d)** 3x$^2$ - $3\sqrt{2}x$ + 1

**Explanation:**

Given: $\alpha + \beta$ = $\frac{\sqrt{2}}{1}$ = $\frac{-(-\sqrt{2})}{1}$ = $\frac{-(-3\sqrt{2})}{3}$

And $\alpha\beta = \frac{c}{a} = \frac{1}{3}$ On comparing, we get, a = 3, b = $-3\sqrt{2}$, c = 1

Putting these values in the general form of a quadratic polynomial ax$^2$ + bx + c,

we have 3x$^2$ - $3\sqrt{2}$ + 1

26. **(a)** 5

**Explanation:**

p(y) = 5y$^2$ + 13y + m.

Given one root of p(x) is reciprocal of other

i.e. If $\alpha$ = a then $\beta$ = $\frac{1}{a}$

sum of roots $(\alpha + \beta)$ = $\frac{-b}{a}$

a + $\frac{1}{a}$ = $-\frac{13}{5}$

Product of roots $(\alpha \cdot \beta)$ = $\frac{c}{a}$

$a \cdot \frac{1}{a}$ = $\frac{m}{5}$.

1 = $\frac{m}{5}$.

m = 5

27.

**(c)** $\frac{b^2-2ac}{ac}$

**Explanation:**

Since

= $\frac{\alpha^2+\beta^2}{\alpha\beta}$

= $\frac{(\alpha+\beta)^2-2\alpha\beta}{\alpha\beta}$

= $\frac{\left(\frac{-b}{a}\right)^2-2\times\frac{c}{a}}{\frac{c}{a}}$

= $\frac{\frac{b^2}{a^2}-\frac{2c}{a}}{\frac{c}{a}}$

= $\frac{b^2-2ac}{a^2} \times \frac{a}{c}$

= $\frac{b^2-2ac}{ac}$

28.

**(d)** a$^2$ + 2b

**Explanation:**

Given, P(x) = x$^2$ - ax - b

$\alpha + \beta$ = a, $\alpha\beta$ = -b

$(\alpha + \beta)^2$ = $\alpha^2$+$\beta^2$ + 2$\alpha\beta$

a$^2$ = $\alpha^2$+$\beta^2$ - 2b

$\alpha^2$+$\beta^2$ = a$^2$ + 2b

29. **(a)** 6 and 8

**Explanation:**

Sum of the zeroes of the polynomial = $\frac{-b}{a}$ = $\frac{6}{1}$ = 6

And Product of the zeroes of the polynomial = $\frac{c}{a}$= $\frac{8}{1}$ = 8

30. **(a)** $x^2$ - x - 12

**Explanation:**

A quadratic polynomial is always in the form of

$x^2$ - (sum of zeros)x + (product of Zeros)

hence the required polynomial is

$x^2$ - (1)x + (-12)

= $x^2$ - x - 12

31. **(a)** – 10

**Explanation:**

Given Polynomial is $p(x) = x^2 + 3x + k$

According to question, $p(x) = 0$ (Put x = 2)

p(2) = 0

$\Rightarrow (2)^2 + 3 \times 2 + k = 0$

$\Rightarrow 4 + 6 + k = 0$

$\Rightarrow k = -10$

32. **(a)** $10x^2$ - x -3

**Explanation:**

$\alpha + \beta = \left(\frac{3}{5} - \frac{1}{2}\right) = \frac{1}{10}, \alpha\beta = \frac{3}{5} \times \left(\frac{-1}{2}\right) = \frac{-3}{10}$

Required polynomial is $x^2 - \frac{1}{10}x - \frac{3}{10}$, i.e., $10x^2$ - x - 3

33.

**(c)** 2

**Explanation:**

We are given $f(x) = \left(k^2 + 4\right)x^2 + 13x + 4k$ then

$\alpha + \beta = \frac{-\text{ Coefficient of } x}{\text{Coefficient of } x^2}$

$= \frac{-13}{k^2+4}$

$\alpha \times \beta = \frac{\text{Constant term}}{\text{Coefficient of } x^2}$

$= \frac{4k}{k^2+4}$

One root of the polynomial is reciprocal of the other. Then, we have

$\alpha \times \beta = 1$

$\Rightarrow \quad \frac{4k}{k^2+4} = 1$

$\Rightarrow \quad (k-2)^2 = 0$

$\Rightarrow \quad k^2 - 4k + 4 = 0$

$\Rightarrow \quad k = 2$

34.

**(d)** -2, -1

**Explanation:**

P(x) = $x^2$ + 3x + 2= 0

$x^2$ + 2x + x + 2 = 0

x(x + 2) + 1(x + 2) = 0

(x + 1)(x + 2) = 0

x = -1, -2

hence, -1 & -2 are the zero of P(x)

35.

**(d)** $\frac{5}{3}, \frac{2}{3}$

**Explanation:**

Let $\alpha, \beta$ be the zero of Polynomial P(x)

P(x) = 3x2 - 5x + 2

$\alpha$ + $\beta$ = $\frac{-b}{a}$ = $\frac{-(-5)}{3}$ = $\frac{5}{3}$

$\alpha\beta$ = $\frac{c}{a}$ = $\frac{2}{3}$

36.

**(b)** 51 years

**Explanation:**

Let the year in which Sam was born be x and the year in which Sam's grandfather was born be y.

Then, according to question, 2002 - x = $\frac{2002-y}{2}$

$\Rightarrow$ 2x - y = 2002 ...(i)

and x + y = 3854 ....(ii)

Solving (i) and (ii), we get $\Rightarrow$ x = 1952

Thus in 2003, Sam's age would be 2003 - 1952 = 51 yrs

37.

**(c)** parallel

**Explanation:**

parallel

38.

**(c)** x = 2, y = 3

**Explanation:**

We have,

$\frac{2x}{3} - \frac{y}{2} = -\frac{1}{6}$ …(i)

$\frac{x}{2} + \frac{2y}{3} = 3$ …(ii)

Now, multiplying (i) and (ii) by 6 we get:

4x - 3y = - 1 …(iii)

3x + 4y = 18 …(iv)

Now, multiplying (iii) by 4 and (iv) by 3 and adding them we get:

16x + 9x = - 4 + 54

x = $\frac{50}{25}$ = 2

Putting the value of x in (iv) we get:

3 $\times$ 2 + 4y = 18

y = $\frac{18-6}{4}$

y = 3

39. **(a)** 4

**Explanation:**

x - 3y + 6 = 0

6 - 3k + 6 = 0

$\Rightarrow$ k = 4

40.

**(b)** does not exist

**Explanation:**

does not exist

41.

**(b)** $\frac{5}{7}$

**Explanation:**

Let the fraction be $\frac{x}{y}$

Where x is numerator and y be denominator.

ATQ. x + y = 12 ...(i)

again

New denominator is y + 3

ATQ. $\frac{x}{y+3} = \frac{1}{2}$

$\Rightarrow$ 2x = y + 3

using 2x - y = 3 ...(ii)

By, Elimination method

Add eq (i) & (ii) we get

$$\begin{array}{r} x + y = 12 \\ 2x - y = 3 \\ \hline 3x = 15 \end{array}$$

x = $\frac{15}{3}$

x = 5

put the value of x in eq. (i) we get

5 + y = 12

y = 12 - 5 = 7.

y = 7

Hence Numerator = 5 denominator = 7.

fraction is $\frac{5}{7}$.

42.

**(c)** x = a, y = b

**Explanation:**

The given equations are

x + y = a + b ...(i)

ax - by = $a^2 - b^2$ ...(ii)

From (i)

y = a + b - x

Substituting y = a + b - x in (ii), we get

ax - b(a + b - x) = $a^2 - b^2$

$\Rightarrow$ ax - ab - $b^2$ + bx = $a^2 - b^2$

$\Rightarrow$ x = $\frac{a^2+ab}{a+b}$ = a

Now, substitute x = a in (i) to get

a + y = a + b

$\Rightarrow$ y = b

Hence, x = a and y = b.

43. **(a)** 12 sq. units

**Explanation:**

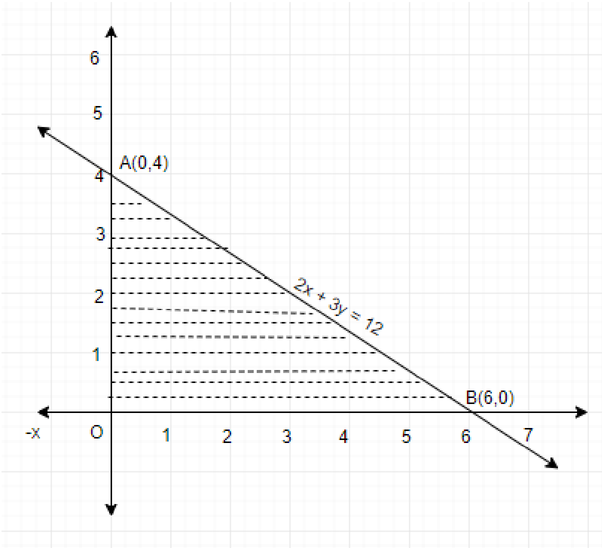
The triangle formed by the lines $2x + 3y = 12$ with co-ordinate axes is shaded.

The area of the shaded region, i.e., $2x + 3y = 12$

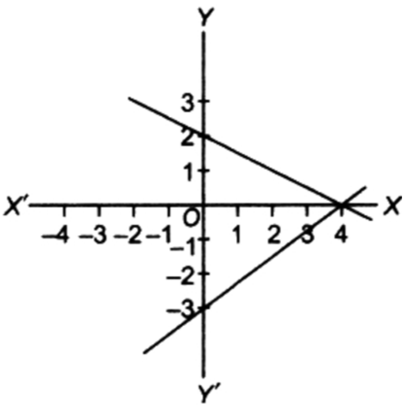
Triangle OAB = $\frac{1}{2} \times$ OA $\times$ AB

= $\frac{1}{2} \times 6 \times 4$ = 12 sq. units

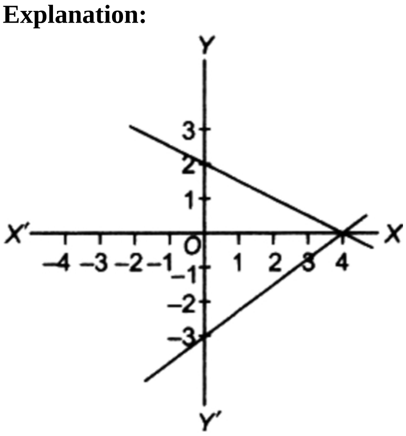
| | | | |
|---|---|---|---|
| $x$ | 0 | 3 | 6 |
| $y$ | 4 | 2 | 0 |




44. **(d)**




**Explanation:**




45. **(a)** $\frac{15}{26}$

**Explanation:**

Let the fraction be $\frac{x}{y}$

According to the question,

$\frac{(x-1)}{(y+2)} = \frac{1}{2}$

2x - 2 = y + 2

y = 2x - 4 …(i)

And,

$\frac{(x-7)}{(y-2)} = \frac{1}{2}$

3x - 21 = y - 2

3x = y + 19 …(ii)

Using (i) in (ii)

3x = 2x - 4 + 19

x = 15

Using value of x in (i), we get

y = 2 (15) - 4

y = 30 - 4

y = 26

Therefore, required fraction = $\frac{15}{26}$

46.

**(b)** 3

**Explanation:**

Since, (-3,2) is the solution of 5x + 3/cy = 3. So (-3, 2) satisfies it.

$\therefore$ 5 x (-3) + 3

$\Rightarrow -15 + 6k = 3 \Rightarrow k = \frac{18}{6} = 3$

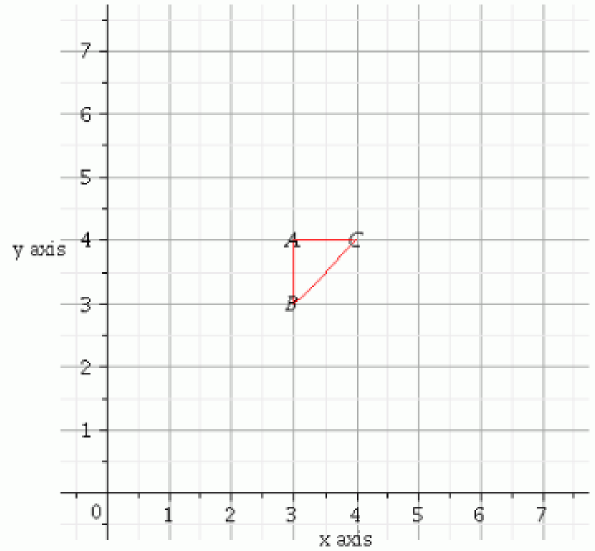
47.

**(b)** 1/2 sq. unit

**Explanation:**

Given x = 3, y = 4 and x = y

We have plotting points as (3,4), (3,3), (4,4) when x = y




Therefore, area of $\triangle$ABC = $\frac{1}{2}$(Base $\times$ Height) = $\frac{1}{2}$ (AB $\times$ AC) = $\frac{1}{2}$ (1 $\times$ 1) = $\frac{1}{2}$

Area of triangle ABC is $\frac{1}{2}$ square units.

48.

**(b)** intersecting or coincident

**Explanation:**

If a consistent system has an infinite number of solutions, it is dependent. When you graph; the equations, both equations represent the same line. So for consistent line it has to be parallel or even they intersect at one point. If a system has no solution, it is said to be inconsistent. The graphs of the lines do not intersect, so the graphs are parallel and there is no solution.

49.

**(b)** intersecting exactly at one point

**Explanation:**

intersecting exactly at one point

50.

**(d)** no solution

**Explanation:**

Here, $a_1$ = 1, $b_1$ = 2, $c_1$ = 5

$a_2$ = -3, $b_2$ = -6, $c_2$ = 1

So, $\frac{a_1}{a_2} = \frac{1}{-3}$ = -($\frac{1}{3}$)
$\frac{b_1}{b_2} = \frac{2}{-6}$ = -($\frac{1}{3}$)
$\frac{c_1}{c_2} = \frac{5}{1}$
$\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$
Therefore, the pair of equations has no solution.

51.
**(b)** $\frac{15}{4}$
**Explanation:**
Condition for the lines to be parallel is
$\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$
Here the equations are
3x + 2my = 2 and 2x + 5y + 1 = 0
So, $a_1$ = 3, $b_1$ = 2m, $c_1$ = -2 and $a_2$ = 2, $b_2$ = 5, $c_2$ = 1
$\therefore \frac{a_1}{a_2} = \frac{3}{2}, \frac{b_1}{b_2} = \frac{2m}{5}$ and $\frac{c_1}{c_2} = \frac{-2}{1}$ = -2
$\therefore \frac{2m}{5} = \frac{3}{2}$
$\therefore$ m = $\frac{15}{4}$

52.
**(b)** intersecting or coincident
**Explanation:**
If a pair of linear equations in two variables is consistent, then its solution exists.
$\therefore$ The lines represented by the equations are either intersecting or coincident.

53.
**(d)** 2
**Explanation:**
$\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$
$\Rightarrow \frac{3}{6} = \frac{-1}{-k} = \frac{8}{16}$
Taking,
$\frac{3}{6} = \frac{-1}{-k}$
$\Rightarrow \frac{1}{2} = \frac{1}{k}$
$\Rightarrow$ k = 2
$\frac{-1}{-k} = \frac{8}{16}$
$\Rightarrow \frac{1}{k} = \frac{1}{2}$
$\Rightarrow$ k = 2
So, the answer is k = 2

54.
**(c)** $\frac{4}{5}$
**Explanation:**
For no solution
$\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$
$\frac{5}{2} = \frac{2}{k}$
k = $\frac{4}{5}$

55.
**(b)** $k \neq 3$

**Explanation:**

If the system has a unique solution, then $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$

Here $a_1 = 6, a_2 = k, b_1 = -2$

and $b_2 = -1$

$\therefore \frac{6}{k} \neq \frac{-2}{-1} \Rightarrow 3k \neq 6 \Rightarrow k \neq 3$

2k ≠ 6

k ≠ 3

56.

**(b)** $2x^2 - 5x = (x-1)^2$

**Explanation:**

$2x^2 - 5x = (x-1)^2$ using $(a-b)^2 = a^2 + b^2 - 2ab$

$2x^2 - 5x = x^2 - 2x + 1$

$2x^2 - 5x - x^2 + 2x - 1 = 0$

$x^2 - 3x - 1 = 0$

a = 1, b = -3 and c = -1

This is of the form $ax^2 + bx + c = 0$ i.e. of degree 2(a $\neq$ 0, a, b, c are real numbers)

Hence this is a quadratic equation.

57.

**(c)** p = 1, q = - 2

**Explanation:**

Given sum of roots, S = p + q = – p and product pq = q

⇒ q(p – 1) = 0 i.e. q = 0 or p = 1

Now If q = 0 then p = 0, this implies p = q

If p = 1, then p + q = – p

q = – 2p

q = – 2(1)

q = – 2

58.

**(b)** -2, 2

**Explanation:**

$x^2 - 4 = 0$

$x^2 = 4$

x = $\pm$2

roots are +2, -2

59.

**(b)** $\alpha + \beta = \frac{b}{a}$

**Explanation:**

If $\alpha$ and $\beta$ are the roots of $ax^2 + bx + c = 0$,

then $\alpha + \beta = \frac{-b}{a}$

60.

**(c)** $\pm\frac{8}{5}$

**Explanation:**

Here, a = 1, b = 5k, c = 16

If $x^2 + 5kx + 16 = 0$ has equal roots,

then, $b^2 - 4ac = 0$

$\Rightarrow (5k)^2 - 4 \times 1 \times 16 = 0$

$\Rightarrow 25k^2 - 64 = 0$

$\Rightarrow 25k^2 = 64$

$\Rightarrow k^2 = \frac{64}{25}$

$\Rightarrow k = \pm\frac{8}{5}$

61.

**(c)** either $k > 2\sqrt{5}$ or $k < -2\sqrt{5}$

**Explanation:**

The roots of $5x^2 - kx + 1 = 0$ are real and distinct.

$\therefore \left(k^2 - 4 \times 16\right) > 0 \Rightarrow k^2 - 20 > 0$

This gives; $k < -2\sqrt{5}$ and $k > 2\sqrt{5}$

62.

**(c)** 1 or 4

**Explanation:**

Since the roots are equal, we have D = 0.

$\therefore 4(k + 2)^2 - 36k = 0 \Rightarrow \{k + 2)^2 - 9k = 0$

$k^2 - 5k + 4 = 0 \Rightarrow k^2 - 4k - k + 4 = 0$

$\Rightarrow k(k-4) - (k-4) = 0$

$\Rightarrow (k-4)(k-1) = 0 \Rightarrow k = 4$ or $k = 1$ .

63.

**(c)** 210 sq.cm

**Explanation:**

Let base of the right triangle be $x$ cm.

Given: Perpendicular = x + 29 = 70 $\Rightarrow$ Perpendicular = $(41 - x)$ cm

Now, using Pythagoras theorem,

$(29)^2 = x^2 + (41-x)^2$

$\Rightarrow 841 = 1681 + x^2 - 82x + x^2$

$\Rightarrow 2x^2 - 82x + 840 = 0$

$\Rightarrow x^2 - 41x + 420 = 0$

$\Rightarrow x^2 - 20x - 21x + 420 = 0$

$\Rightarrow x\left(x - 20\right) - 21\left(x - 20\right) = 0$

$\Rightarrow \left(x - 20\right)\left(x - 21\right) = 0$

$\Rightarrow x - 20 = 0$ and $x - 21 = 0$

$\Rightarrow x = 20$ and $x = 21$

Therefore, the two sides other than hypotenuse are of 20 cm and 21 cm.

$\therefore$ Area of right triangle = $\frac{1}{2} \times$ Base $\times$ Perpendicular = $\frac{1}{2} \times 20 \times 21$ = 210 sq. cm

64.

**(b)** 3

**Explanation:**

The given equation is $x^2 + ax + 3 = 0$

One root = 1

and product of roots = $\frac{c}{a} = \frac{3}{1}$ = 3

Second root = $\frac{3}{1}$ = 3

65.

**(c)** $\left(\sqrt{2}x + \sqrt{3}\right)^2 + x^2 = 3x^2 - 5x$

**Explanation:**

In equation $\left(\sqrt{2}x+\sqrt{3}\right)^2+x^2=3x^2-5x$

$\Rightarrow 2x^2+3+2\sqrt{6}x+x^2=3x^2-5x$

$\Rightarrow 3x^2-3x^2+5x+2\sqrt{6}x+3=0$

$\Rightarrow \left(5+2\sqrt{6}\right)x+3=0$

It is not the quadratic equation because its degree is not 2.

66.

**(c)** 16 m

**Explanation:**

2(l + b) = 82 ⇒ l + b = 41 ⇒ l = (41 - b).

And, lb = 400 ⇒ (41 - b)b = 400

⇒ $b^2$ - 41b + 400 = 0 ⇒ $b^2$ - 25b - 16b + 400 = 0

⇒ b(b - 25) - 16(b - 25) = 0

⇒ (b - 25)(b - 16) = 0

∴ b = 25 or b = 16.

But for b = 25 we have l = (41 - 25) = 16 < b.

∴ breadth = 16 m.

67.

**(b)** $\pm 6$

**Explanation:**

For equal roots

D = 0

$b^2$ - 4ac = 0

$(-k)^2$ - 4(3)(3) = 0

$k^2$ - 36 = 0

$k^2$ = 36

k = $\pm 6$

68. **(a)** 0, 8

**Explanation:**

If a quadratic equation $ax^2$ + bx + c = 0, a ≠ 0 has two equal roots, then its discriminant value will be equal to zero i.e., D = $b^2$ - 4ac = 0

Given, $2x^2$ – kx + k = 0

For equal roots,

D = $b^2$ - 4ac = 0

⇒ $(-k)^2$ - 4(2)(k) = 0

⇒ $k^2$ - 8k = 0

⇒ k (k - 8) = 0

∴ k = 0,8

69.

**(c)** $2x^2$ – 7x + 6 = 0

**Explanation:**

Given, $2x^2$ - 7x + 6 = 0

If 2 satisfies the above equation then 2 is a root.

Now, $2(2)^2$ - 7(2) + 6 = 0

∴ 2 is a root of this equation

70.

**(d)** Real and Distinct roots

**Explanation:**

D = $b^2$ - 4ac

D = $2^2$ - 4 × 3 × (-1)

D = 4 + 12

D = 16

D > 0.

Hence Real and distinct roots.

71.

**(c)** 3 and 4

**Explanation:**

Putting the values of p and q in given equation, we get

$x^2$ + (-7)x + 12 = 0

⇒ $x^2$ - 7x + 12 = 0

⇒ $x^2$ - 4x - 3x + 12 = 0

⇒ x(x - 4) - 3(x - 4) = 0

⇒ (x - 3)(x - 4) = 0

⇒ x - 3 =0 and x - 4 = 0

⇒ x = 3 and x = 4

72.

**(b)** no real roots

**Explanation:**

Let, $x^2$ = y, then our given equation become

$(y+1)^2 - y = 0$

$\Rightarrow y^2 + y + 1 = 0$

$D = b^2 - 4ac = 1^2 - 4 \times 1 \times 1 = 1 - 4 = -3 < 0$

Hence no real root.

73.

**(d)** 2 : 7

**Explanation:**

Sum of roots = $\frac{-b}{a}$

$= \frac{-(-6)}{5} = \frac{6}{5}$

product of roots $= \frac{c}{a}$

$= \frac{21}{5}$

ATQ

$\frac{\text{Sum of roots}}{\text{prod. of roots}} = \frac{\frac{6}{5}}{\frac{21}{5}} = \frac{6}{21}$

$= \frac{2}{7}$

74.

**(b)** 2

**Explanation:**

If $\frac{1}{2}$ is a root of the equation $x^2$ + kx - $\frac{5}{4}$ = 0 then, substituting the value of $\frac{1}{2}$ in place of x should give us the value of k.

Given, $x^2$ + kx - $\frac{5}{4}$ = 0 where, $\mathrm{x} = \frac{1}{2}$

$\Rightarrow \left(\frac{1}{2}\right)^2 + \mathrm{k}\left(\frac{1}{2}\right) - \frac{5}{4} = 0$

$\Rightarrow \frac{k}{2} = \frac{5}{4} - \frac{1}{4}$

$\therefore$ k = 2

75.

**(b)** $b^2 - 4ac > 0$

**Explanation:**

A quadratic equation $ax^2 + bx + c = 0$ has real and distinct roots, if $b^2 - 4ac > 0$.